REMARKS

Claims 1-8 are pending in this application.

Reconsideration and allowance of the claims are respectfully requested in view of the following remarks.

I. Rejection Under 35 U.S.C. §102

The Patent Office rejects claims 1-5, 7 and 8 under 35 U.S.C. §102(e) over U.S. Patent Publication No. 2004/0038114 to Wariishi et al. ("Wariishi"). This rejection is respectfully traversed.

Claim 1 recites:

> A fuel cell system comprising:
> a fuel cell stack having an anode and a cathode;
> a first supply passage and a second supply passage that communicate with each other in the fuel cell stack and supply fuel gas to the anode;
> an exhaust passage that is connected to the second supply passage and discharges exhaust gas from the anode;
> an opening and closing unit that opens and closes the exhaust passage; and
> a flow amount controlling unit that controls flow amounts of the fuel gas passing through the first supply passage and the second supply passage, wherein
> the flow amount controlling unit executes a control for supplying fuel gas to the anode in simultaneous flow from both the first supply passage and the second supply passage and varies a ratio between the flow amounts passing through the first supply passage and the second supply passage when the exhaust passage is closed.

Claim 8 recites:

> A method of supplying fuel gas to a fuel cell system comprising a fuel cell stack having an anode and a cathode; a first supply passage and a second supply passage that communicate with each other in the fuel cell stack and supply fuel gas to the anode; and an exhaust passage that is connected to the second supply passage and discharges exhaust gas from the anode, the method comprising the steps of:
> a step of opening and closing the exhaust passage; and

> a step of controlling flow amounts of the fuel gas passing through the first supply passage and the second supply passage, wherein
>
> the step of controlling flow amounts executes a control for supplying fuel gas to the anode in simultaneous flow from both the first supply passage and the second supply passage and varies a ratio between the flow amounts passing through the first supply passage and the second supply passage when the exhaust passage is closed.

Wariishi does not disclose each and every feature of claims 1 and 8.

Wariishi discloses a fuel cell where a fluid comprising at least one of an oxygen-containing gas, a fuel gas, and a coolant is supplied to, and discharged from, fluid holes that extend throughout the fuel cell (Wariishi, paragraph [0014] and Fig. 2). The fuel cell of Wariishi is further capable of continuously changing the direction of the fluid flow (Wariishi, paragraph [0013]). To accomplish this, Wariishi's fuel cell includes a switching mechanism for selecting a fluid hole from a plurality of fluid holes to be used as the fluid supply port (for supplying fluid to the fluid flow field), or a fluid discharge port (for discharging the fluid from the fluid flow field) (Wariishi, claim 1). During use, a predetermined fluid hole is selected as a supply port or a discharge port to change the direction of the fluid flow, without stopping the continuous flow of fluid (Wariishi, paragraphs [0014] to [0018]; and claim 1). Wariishi further discloses a fuel cell system where fuel gas is supplied from two fluid holes during use (Wariishi, paragraphs [0075], [0076] and Fig. 8).

However, Wariishi does not disclose a flow amount controlling unit that varies a ratio between the flow amounts passing through the first supply passage and the second supply passage when the exhaust passage is closed, as recited in claim 1; or a method comprising a step of controlling flow amounts, which varies a ratio between the flow amounts passing through the first supply passage and the second supply passage when the exhaust passage is closed, as recited in claim 8. Wariishi merely varies the direction of fluid flow (*e.g.*, the direction of the oxygen-containing gas, the fuel gas, and the coolant), but the applied

reference does not disclose varying the ratio between the flow amounts passing through the supply passages.

It is well settled that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently, in a single prior art reference. See MPEP §2131. In view of the foregoing, Wariishi fails to disclose each and every feature of claims 1 and 8 and, thus, does not anticipate claims 1 and 8. The remaining claims variously depend from claim1 and, likewise, are also not anticipated by Wariishi for at least the reasons set forth above with respect to claim 1, as well as for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

II. Rejection Under 35 U.S.C. §103

The Patent Office rejects claims 1-8 under 35 U.S.C. §103(a) over WO 02/089244 to Ibrahim et al. ("Ibrahim") in view of Wariishi. This rejection is respectfully traversed.

The above discussion with respect to Wariishi applies here.

The Patent Office acknowledges that Ibrahim does not disclose a controlling unit controlling the supply of fuel to the anode in simultaneous flow from both the first and the second supply passages (Office Action, page 4). Nevertheless, the Patent Office applies Ibrahim as allegedly addressing additional features recited in the pending claims. However, for at least the reasons set forth below, Ibrahim and Wariishi would not have rendered obvious the subject matter of the pending claims.

Ibrahim's system is configured to have alternating flow, where fuel gas is supplied either through the first fuel supply channel in one direction, or though the second fuel supply channel in the opposite direction, but not through both passages at the same time (Ibrahim, paragraph [0007]). Alternating flow accomplishes the primary objective of Ibrahim, which was to reduce mixture variation between individual fuel cells by reversing the unidirectional

flow direction, (Ibrahim, Abstract and paragraphs [0005] to [0007]). However, an unfortunate but inevitable result of Ibrahim's design is that there will always be a localized concentration of impurities at the downstream end in Ibrahim's cell (see specification, Figure 4A). Put differently, it is extremely difficult to prevent accumulation of impurities at one end of the fuel cell stack in systems (such as Ibrahim's) that are designed to have only unidirectional flow (regardless from which direction). Unidirectional flow systems are further handicapped by being unable to improve upon the efficiency of fuel usage (see specification, page 10, lines 27-36).

Wariishi suffers from similar deficiencies.

Wariishi, as described above, merely discloses a switching mechanism that is put in place to select a fluid hole (from a plurality of holes) to be used as the fluid supply port or the fluid discharge port. Therefore, Wariishi merely varies the flow direction of the fuel gas, and not the ratio between flow amounts passing through the two supply passages, as recited in claims 1 and 8.

In contrast to Wariishi and Ibrahim, the simultaneous, bidirectional flow characteristics of Applicant's claimed system allow for a significant control of the extreme downstream position (see, e.g. specification page 10, lines 1-8). The system and method of claims 1 and 8, respectively, achieve at least the following beneficial results: (1) effective diffusion of impurities; (2) effective diffusion of dew water; (3) prevention of flooding; (4) prevention of dryout; and (5) a superior improvement in fuel efficiency (see specification, page 9, line 37 to page 10, line 17 and lines 37-49, and Figure 4B). Ibrahim and Wariishi does not disclose how to achieve these results, or even that these results could be achieved, with any reasonable expectation of success, without the benefit of Applicant's specification.

In view of the foregoing, Ibrahim and Wariishi would not have rendered claims 1 and 8 obvious. The remaining claims variously depend from claim 1 and, likewise, would not

have been rendered obvious by the applied references, for at least the reasons set forth above with respect to claim 1, as well as for the additional features recited therein.

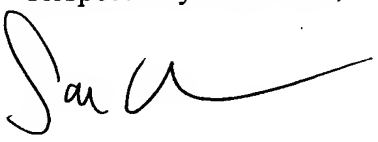
Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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